N. A. C. A. BULLETIN

Vol. XXIV, No. 2 September 15, 1942

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This Bulletin is published semi-monthly by the National Association of Cost Accountants, 385 Madison Avenue, New York. Subscription price, $10.00 per year. Entered at the Post Office, New York, N. Y., as second-class matter August 28, 1925, under the Act of March 3, 1879.

EDITORIAL DEPARTMENT NOTE

"What is cost?" is a question which is popping up quite frequently these days. In no area is there greater difficulty in obtaining agreement on principles and in applying these principles to determine amounts than in the area of plant asset accounting, where problems of depreciation, amortization, maintenance and application of related fixed charges to products pose many knotty questions. You may not agree completely with some of the ideas expressed by Mr. Foley in the first article in this issue, but we prophesy that you will find it stimulating further thought on the subject.

Nelson H. Foley, the author of this article, has been with Scovell, Wellington & Company for 20 years, during the last half of which he has been in charge of the management engineering work of the Springfield office of this firm. He received his early business training at the College of Business Administration of Boston University. In addition to his professional work, Mr. Foley has served for the past 17 years as a Lecturer on Business and Government and on Industrial Management at the Springfield Division of Northeastern University.

The second article in this issue of the *Bulletin* will be of particular interest in view of the present shortage of office workers and business machines. The author of this article, Henry F. Burrows, is like Mr. Foley a member of the Springfield Chapter. At present Assistant Treasurer and Office Manager of the Old Colony Envelope Co. of Westfield, Mass., Mr. Burrows served for three years in the Accounting Department of the First National Bank of Westfield and six years in the Cost Accounting Division of the Strathmore Paper Co. before joining his present company 17 years ago. He is a graduate of the Springfield Division of Northeastern University and has been active in the management of the Springfield Chapter of N.A.C.A., serving for four years as Secretary of the Chapter.

Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the views expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin*.

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SEPTEMBER 15, 1942

PLANT VALUES AND THEIR EFFECT ON COSTS AND INVENTORY VALUATIONS

By Nelson H. Foley, Supervisor of Industrial Engineering, Scovell, Wellington & Company, Springfield, Mass.

IN MANUFACTURING businesses the fixed charges such as depreciation, taxes, insurance and interest on investment (when used) amount to a substantial portion of the overhead and the total cost. These charges are based on the valuations assigned to plant (which includes land, buildings, machinery, equipment and tools); and, therefore, it is important that these valuations be given the consideration which they deserve.

Inadequacy of Early Plant Values for Cost Purposes

In the early days many difficulties were encountered in attempting to establish the proper plant values for cost purposes. The older ledger asset accounts were famous for what they concealed rather than what they revealed. Supporting data were not available. Invoices had long since been destroyed. In many companies the reserves for depreciation were not separated from the asset accounts, so that the latter accounts represented the net depreciated values. In many companies depreciation was written off only in the years which showed profits, or the amounts written off in the profitable years were greater than in the loss or low profit years.

After hours of analysis of old records, the result usually was far from satisfactory. A certain amount of estimating was always necessary. Even when actual costs were ascertained it was discovered that varying prices had been paid for almost identical machines because they were bought in years of differing market price levels.

Several years ago the cost accountant in a paper mill prepared a burden statement and developed machine-hour rates. The company had written down its fixed asset values to ridiculously low figures. The treasurer of the company insisted that these values be used in calculating the fixed charges to be included in cost. As a result the hourly rates were very low compared to those of other mills.

A few years later they added two new pieces of machinery (at approximately $25,000 each) to perform additional operations, and

they wanted the machine-hour rates revised. The revision was made, using the new costs for the new machines and the old values (which the treasurer insisted on using) for the old machines, two of which would have cost over $100,000 each to replace.

The results were laughable. The machine-hour rates on the two new machines were greater than those on the two old and larger machines (which would have cost over $100,000 each to replace). After reviewing the calculations to find out what was wrong, we pointed out the effect that the distorted valuations had on the results and recommended that the company have an appraisal made. This was done, with the result that the fixed charges were based thereafter on the proper relative replacement values.

Another company acquired the majority of its machinery at very low cost in a depressed machine tool market, although the machinery was in first class condition. The low actual cost was used as a basis for the calculation of depreciation for cost purposes. A few years later they expanded the business and bought more of the same type of machinery at much higher prices. As a result they found that their fixed charges were higher than originally figured. The same thing would have happened as the old machinery wore out and had to be replaced, or if a fire had necessitated replacement. For cost purposes, the fixed charges should have been calculated originally on productive replacement values.

Importance of Productive Replacement Values

As a result of the inequalities inherent in the old actual-cost valuation approach, the appraisal or replacement valuation approach to the problem of machinery and equipment valuation has been quite generally adopted.

The appraiser is not concerned with what variations have occurred in the price levels at which identical or similar equipment was purchased, or whether the equipment was purchased second hand. In fact, using the straight appraisal approach, he has no way of determining what was paid for machinery or equipment without reference to company records (which is not customary) in arriving at the present approximate value of the equipment, and life for net valuation and insurance purposes. In the present discussion we are concerned only with the first or present fair replacement values.

Appraisal replacement values, however, are not the answer to all of our problems in determining fair valuations for cost purposes. We have run across several cases where machines were overvalued for cost purposes because they were not regularly, if ever, performing the work originally expected of them.

In one company there were two machines side by side running at the same speed, working on the same products, turning out the same quantity. One machine cost $10,000, the other cost $6,000. Investigation showed that the machine which cost $10,000 had been purchased because it would perform special operations which the other machine could not do. Further investigation proved that it was impractical to use the machine for these special operations, and therefore, from the point of view of actual use, it was worth no more than the other machine. As a result each of these machines was given a productive replacement value of $6,000.

In another case a machine originally costing $2,500 with a replacement value of approximately the same amount was being used continuously to perform an operation which could have been performed just as well on a machine which cost only $250. The company had no other use for this machine and kept it only to perform this one simple operation. For cost purposes that machine should have been given a productive replacement value of $250, and the fixed charges should have been calculated on the same value.

The cost engineer—and more and more "cost accounting" is evolving into what we may some day call "cost engineering"—must constantly have in mind the purposes for which his cost figures are to be used. One of the most important of these uses is the determination of the total cost which will be used in setting selling prices or in determining the items which can or cannot be sold at a profit.

We are prone to think of plant assets as "fixed." In reality they are fixed only in the sense that they are being converted into current assets (such as inventories, receivables and cash) much more slowly than labor, material and other expenses. A company must always have plant and equipment with which to convert, but these assets do not remain static; they wear out or become obsolete, and as they do they are replaced by new plant and equipment.

Determination of Productive Replacement Values Job of Cost Engineer

In the process of costing we must be sure that the conversion factors (fixed charges) will facilitate and not prevent this conversion. For this purpose we must establish fair *productive replacement values.* At least the more important items of machinery and equipment should be studied and *fair productive replacement values determined,* based on studies of productive performance.

The appraiser is not concerned with the productive value of the equipment or the use to which the equipment is put. He will not ordinarily know which equipment is fully depreciated or which equipment was purchased second hand and, therefore, will arrive at the correct replacement values but not necessarily the productive replacement values. *The determination of the productive replacement values* is the job of the *cost engineer.*

Fully depreciated assets should be included in determining the productive replacement values on which fixed charges are to be calculated. The fact that assets have been fully depreciated is merely evidence that the depreciation written off in the past was in excess of that required under the circumstances.

The fundamental principle involved is the same as that illustrated earlier in the case of machinery or equipment purchased second hand at very low values. Second-hand machinery should be revalued in accordance with its productive performance replacement value. Similarly, overvalued or obsolete machines still in use must be reduced to fair productive replacement values.

Handling Depreciation Charges

The use of productive replacement values does not interfere with the general ledger and tax accounting for depreciation. Generally the fixed charge journal entry serves to debit or charge the depreciation (based on productive replacement values) into the cost ledgers or burden accounts, and the credit goes to a fixed charge variance or adjustment account. The depreciation on the cost of the plant assets, which is to be added to the reserves and taken on the income tax returns, is put through the books in an entry crediting the reserves for depreciation and debiting the fixed charge variance or adjustment account.

The balance in this account represents the difference between the depreciation used for cost purposes and that added to the reserves and taken on the tax returns. This difference is brought back on the profit and loss statement as an adjustment. Obviously the depreciation (used for cost purposes) on fully depreciated assets also will be included in this adjustment account.

Accelerated Depreciation Under Present Abnormal Conditions

In my opinion, companies operating on two shifts should accelerate their normal depreciation write-off to at least 150 per cent, and those operating on three shifts to at least 200 per cent of normal. This principle should be followed whether the accelerated amount is allowed as a deduction on the Federal income tax return or not. Those who have seen the wear and tear that machinery and equipment is being subjected to under present conditions know that the increased amount of depreciation is there.

Believe it or not, machinery requires a rest occasionally, but there is no opportunity for that today. With the present high percentage of inexperienced or even less experienced operators, the natural life of machinery is being exhausted much more rapidly than under normal conditions. Repairs are being neglected because of the pressure for production. In all too many cases toward the end of a shift, men nurse along ailing machines and let the men on the next shift worry about the repairs.

It seems unfortunate if not unfair that, in spite of these obvious factors, the amount of increased depreciation is difficult to determine accurately; and that stiffening tax regulations are going to make it more difficult to substantiate any sizable increase in the amount of depreciation the taxpayer may feel is a justifiable charge-off against income on the tax returns.

Many companies which have not kept their plant and equipment up to date would be well advised to revalue their plant and equipment and their capital structure. For many, there is no hope of converting that which is still useful unless this is done and their costs are adjusted accordingly so that some business can be obtained.

Rehabilitation

A business can remain competitive only if its plant and equip-

ment is kept up to date through extensive continuous rehabilitation or through the purchase of new modern equipment, which may require new capital.

Executives often wail that they have no money to spend for rehabilitation—by that I mean a complete overhauling, reconditioning and modernizing of machinery and equipment. These same executives overlook the fact that they are paying for that rehabilitation again and again, without getting it, through breakdowns and repairs with the resultant loss of production, slow speed and high cost.

One unusually successful company has maintained a consistent rehabilitation policy for years. It practically never repairs a machine or piece of equipment. When machines cause trouble, they are promptly hauled away to the machine shop and given a complete overhauling and modernizing. In fact, the failure of one of a group of machines may result in one after the other of those machines being given the same reconditioning treatment. If a machine has friction bearings, and anti-friction bearings will improve its performance, it gets them. That is just an illustration of the thoroughness of this rehabilitation. This particular company has had plenty of competition, but one by one it has outstepped its competitors. This has been accomplished not by price cutting but rather through a constant search for cost reduction possibilities.

Application of Fixed Charges to the Product

After the fixed charges (based upon productive replacement values) have been calculated and distributed to departments, normal operating budgets for other departmental fixed and variable overhead expenses must be developed. In many companies this distribution will be broken down into production centers within departments.

In connection with the preparation of the manufacturing expense budget, normal operating levels must be determined. These normal operating levels determine the variable expense allowances and the divisors which are to be used in calculating the departmental or production center overhead or burden rates.

For normal costing the manufacturing expense budget should be based on one-shift normal operation, except in those industries

where it is customary to operate on a two- or three-shift basis. In the majority of departments in the average company, a fair normal would be approximately 85 per cent of the total possible capacity on a one-shift basis.

There are, however, many processes, machines or departments which will never operate up to the level of, or in balance with, other parts of the plant. These must be given special consideration. For example, in one company a limited application special purpose machine, developed at considerable cost, is used only a few days a month in producing the present normal sales demand. The fixed charges and other operating expenses of this machine are divided by its average actual operating hours, and the rate so determined is used to cost the product passing through and in determining the total cost on which selling prices are based. The reduction in the cost per unit which followed the development of this machine justified this method of handling its cost of operation.

Use of Normal Capacity

If the manufacturing expense budget and the burden rates are based on less than normal capacity, there is danger that the resultant rates will be so high as to discourage the acceptance of business which would assist in reaching the desired normal capacity level, Such high costs often lead to the conclusion that certain products cannot be sold at a profit, with the same result. The best way to earn burden or absorb overhead is to figure the proper spread of overhead in the first place. The following principle must be recognized: "In a competitive market a business cannot sell its customers its unused capacity as such."

The only way a business can reach normal capacity and thereby absorb all of the manufacturing expenses (unless it has a highly protected or non-competitive product) is to determine what the expenses and overhead rates would be at that operating level. The cost estimates and the selling prices should be built up on that basis, with the result that the sales department receives figures or selling prices which should enable it to get the volume of business required for normal capacity operation. When normals are set too low, higher costs result, selling prices are set too high, volume drops and unabsorbed fixed expense or burden is the result.

It is advisable to show management a schedule of idle capacity cost or fixed expenses underabsorbed, so that new products will be developed with unused equipment in mind or other uses will be found for such equipment.

Today many plants are operating on two or three shifts. This is an abnormal condition and will last only as long as the emergency. In my opinion overhead or burden rates should still be based on normal one-shift operation. This would not apply when working on cost-plus contracts, where actual costs have to be determined.

STREAMLINING THE ACCOUNTS RECEIVABLE RECORD

By Harry F. Burrows, Accountant,
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CHANGES occur in business practice which represent an advance or an improvement over previous methods. While these improvements generally tend toward simplification, the accounting records which reflect the business transaction often are not simplified, due to habit or to oversight of the fact that the record can be made simpler if the transaction itself has made a stride in this direction. Today simplification of record-keeping should be an objective in every office. It conserves time and thereby fills the gap left by those being called to serve their country; it helps to conserve office machines, of which there is a shortage; and it cuts costs.

This paper deals with a possible change in recording accounts receivable transactions, made possible by the almost universal change that has taken place in methods of settling accounts. In many lines of business, people have discontinued the old practice of payment on account, and are paying according to invoice or statement. This change in business practice was encouraged by the cash discount terms, which have made it financial wisdom to pay accounts within the discount period. This practice has made the cashier's job easier; yet in many instances the opportunity to simplify the record of transactions has not been recognized.

Former Practice Changed

It was observed in our own case that, when a customer's remittance was received, the first operation was to note whether the account was paid per statement, in which case the account was ruled off in the accounts receivable ledger. If specific invoices were paid, the invoices paid as noted in the ledger were checked off. In the latter case after the payment was posted, the balance consisted of open items on the record. After studying this procedure it was recognized that the same result would be achieved if copies of invoices were filed according to customer; when payments were made the paid items could be withdrawn from the file.

The change-over from a posted ledger to an invoice file was not made without serious consideration. The first handicap was habit. The old record had been maintained for some time, and proof had to be shown that the change in method would produce adequate information and would operate satisfactorily. The second problem was whether our public accountants would accept this method of record keeping. They not only approved, but also informed us of three other firms in our vicinity who were operating their accounts in this manner. These concerns were approached and they permitted us to review their methods. On the basis of our thoughts and their experience the procedure described below was established for our use.

Filing Equipment

Our first decision was to secure the most convenient filing equipment. Our final choice was a single cabinet with two tiers of filing pockets, each tier holding about 375 divisions, which was just suited to the number of customers on our list. Any suitable filing equipment can be adopted for this system and we do not wish to be partial to any, or to advertise the merits of any special equipment. This decision rests with the individual user and their problem. Practically all our customers pay 100 per cent of their accounts each month, therefore we use one tier in the cabinet for current filing; the other tier contains the invoices listed on the customers' statement as of the first of the month. Only two individuals have access to the file, and are responsible for maintaining it accurately. The accounts receivable clerk files the invoices and

produces the statements at the close of the month. The cashier withdraws the paid invoices on the basis of customers' payments.

Other precautions which facilitate the accuracy of the work were established. All credit memorandums were to be made with the use of red carbons. The sub-totals on invoices of more than one sheet in length were to be plainly marked with the words "sub-total forwarded." Invoices with corrected figures or illegible figures, due to fumbled strokes, were to be legibly corrected.

Procedure

The billing department is to produce an extra copy of each invoice which is to be filed as the charge against the customer for the sale. In case of miscellaneous charges or credits made through the journal, a journal memo is to be compiled on a form provided for this purpose, and placed in the customer's file.

The accounts receivable clerk analyzes the sales record copies of invoices daily, and summarizes the amounts by accounts. This analysis sets up a daily control for the accounts receivable. The accounts receivable copies of the invoices are totaled and balanced to this daily control figure. After checking to the control, the invoices are filed according to customer.

At the close of the month this file of customers' invoices is divided between two calculating machine operators who add their section, note the total of the invoices in each customer's section on the top invoice, and then check each other's calculations.

Statements

The customers' statements are prepared from these totaled invoices on an adding machine having a split keyboard. The first two columns on the keyboard are the date columns, and the balance of the keyboard has the adding features. The statement forms have been addressographed with the customers' names and addresses and proper date. The statements are made in duplicate, and the carbon is pre-inserted. The original is mailed to the customer, and the copy becomes the office record of statements mailed the first of each month. These statements are bound and become the accounts receivable record as of the first of the month. The statement lists the dates and amounts of the various invoices, and the total should agree with the total noted by the calculating ma-

chine operator. This information is exactly the same as was furnished to our customer under the old method of ledger posting. An economy of time could be effected if the statement noted only the month and the total of all the invoices. For further internal check, the copies of the statements to be mailed to the customers are passed on to the auditor, who adds the individual statements, compares their total with the accounts receivable control and has them mailed out under his supervision.

Cash Collections

Payments received from customers are handled by the cashier. It will be recalled that the statement was made that one tier of our file contains the copies of invoices that were listed on the customers' statements as of the first of the month. We find this practice most convenient, since the majority of our customers pay per statement. The invoices representing the customers' remittances are withdrawn from the accounts receivable file. The date of payment is stamped on the top invoice of the group. Checks are recorded in the cash receipts record and proper credit posted in the accounts receivable column. The withdrawn invoices are given to a calculating machine operator who totals them and checks the figure with the total in the accounts receivable control column of the cash record for the day. These paid invoices are then filed by the file clerk in a paid invoice file, by customer.

Occasionally a customer makes a partial payment on account. When the remittance does not cover specific invoices, we remove from our file as many of the oldest bills as the payment covers and apply the balance between the invoices removed and the payment to the next invoice in the file. This amount is noted directly on the invoice in ink. In instances where we know the customer will remit for the balance of the account in full within a short time, a credit memo for the amount of the partial payment is inserted in the file, and no invoices withdrawn.

Advantages

This method of keeping accounts receivable records has been in effect for two years at our office. Our own experience indicates a decided advantage over the ledger method of maintaining this same information. So far we have found no disadvantages; there

has been a speed-up in our work, and a reduced cost. When remittances are received, the cashier has before him the maximum amount of information about the account without reference to any other record. Any questions can be readily answered without loss of time. Occasionally requests are received from customers for duplicate invoices. The minimum amount of time is required under this method of record-keeping, for the file contains the detailed invoices by customer.

Under the ledger method it took a clerk an average of three hours per day to post and prove the day's work. Filing the invoices is a matter of fifteen minutes or less per day. Another factor just as important as the time saved has resulted. The short job of filing invoices produces less fatigue and greater accuracy than the ledger method. Under the old system it was usual to look for errors in posting to wrong accounts which showed up when remittances were received. It is extremely unusual to find a misfiled invoice under our present method.

Another saving of time occurs at the end of the month. Work on statements can be started immediately after the last day's invoices are filed. Previously the accounts in the ledger were balanced to the control before statements were commenced. Today our calculating machine operators require less than two hours to add and check the total for the customers' statements. The accounts receivable clerk turns out the actual customers' statements in the balance of the working day. The accuracy of this method again shows up at this point, for our auditor has not had any difficulty in tallying the total of the statements with the accounts receivable control. The customers receive the statements of their accounts at least twenty-four hours earlier than under the previous method. It may be well to state at this point that our volume is about twenty-five hundred invoices per month going to about three hundred and fifty customers.

Benefits Gained

Another convenient factor resulting from this method is the visual check the treasurer has on the way remittances are received. Our terms of sale call for settlement of accounts ten days after the close of the month. The invoices remaining in the statement section of the file after payment date can be reviewed in a very

short time, and prompt action taken for request for settlement. At the end of the month and prior to sending out new statements, the unpaid invoices are summarized in a report, and then combined with the invoices for the current month and incorporated in the new statement.

The file of paid invoices for the year gives us a convenient source of information for each customer. We maintain sales statistics on all our sales which are compiled into standard reports. However, we occasionally receive requests at the end of the year from customers who request information for which we have not provided in our routine sales analysis. A review of the invoices in the paid invoice file for the particular customer gives us the quickest and most convenient source for the answer.

Our method of supplying our public accountants with information on our accounts receivable makes it conform to the new standards of auditing procedure. At the close of the year a typed list is made of our statements showing the customers' names and addresses, and the amounts recorded on the statements. This report accompanies the customers' statements which are sent to the accounting firm for checking and mailing. This list serves as their record of the accuracy of the accounts receivable control at the close of the year.

The filing of copies of invoices to produce the accounts receivable ledger is not limited to small applications and where account turnover is small. The district offices of Standard Oil Company of New York use it to accumulate and bill purchasers of their product on credit cards at their filling stations. The numbering system of accounts is employed in this case due to the rapid change in the account list. A concern of national repute in Rochester maintains thousands of accounts employing this principle.

With more and more concerns eliminating the practice of sending statements at the close of the month, it may become universal practice in those cases where customers have taken on the habit of paying per invoice. Another operation will then be eliminated, and further savings result.